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Dependence of the long-term variations in the F2-layer critical frequency at midlatitudes on the geomagnetic field

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Abstract

A long-term trend in the F2-layer critical frequency (foF2) has been distinguished based on daytime data of midlatitude stations in the Northern Hemisphere, obtained from 1957 to 1995, and using special measures aimed at eliminating the influence of solar and geomagnetic activities on the ionosphere. It has been obtained that the trend sign and value depend significantly on longitude. The values of the negative trend in foF2 are maximum at the longitudes near the extremal negative declination of the magnetic field. This longitude effect is apparently related to the plasma drift due to the westward thermospheric wind via the long-term wind variations and secular variations in the magnetic field. The increase in the westward wind during 1957-1995 may be related to the time increase in the magnetic disturbance frequency and to a relatively slow wind relaxation to undisturbed state after the end of a magnetic disturbance.